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Datasheet for the decision of 3 May 2013

Case Number: T 0418/10 - 3.3.05

Application Number: 03722623.0

Publication Number: 1499434

IPC: B01J 8/44, F23C 10/20

Language of the proceedings: EN

Title of invention:
Grid construction for a fluidized bed reactor and a method of removing coarse material from a fluidized bed reactor

Patent Proprietor:
Foster Wheeler Energia Oy

Opponent:
Kvaerner Power Oy

Headword:
Grid/FOSTER WHEELER

Relevant legal provisions:
EPC Art. 56, 114(2)

Keyword:
"Inventive step (main request): yes - non obvious alternative"

Decisions cited:
T 1485/08

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0418/10 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 3 May 2013

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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 15 December 2009 rejecting the opposition filed against European patent No. 1499434 pursuant to Article 101(2) EPC.

Composition of the Board:

Chairman: G. Raths
Members: J.-M. Schwaller
C. Vallet

Summary of Facts and Submissions

I. The present appeal lies from the decision of the opposition division rejecting the opposition filed against European patent No. 1 499 434.

Independent claims 1 and 11 as granted read as follows:

"*1. A grid construction (40) for a fluidized bed reactor, the reactor including a reaction chamber (12) defined by substantially vertical walls, in which a fluidized bed of solid particles is maintained, and a windbox (18) under the reaction chamber, in a lower portion of the reactor, said grid construction being positioned between the reaction chamber and the windbox and comprising:*
at least one discharge duct (34) for withdrawing coarse material from the reaction chamber;
multiple nozzle lines (48, 82) having continuous structures providing smooth surfaces for distributing fluidizing gas from the windbox into the reaction chamber, for suspending the fluidized bed in the reaction chamber; and
continuous trenches (50,78) between said nozzle lines, wherein said nozzle lines comprise multiple gas outlets (52, 72, 114, 122), having a main gas flow direction, at side faces (46, 74,126) of said nozzle lines, for directing fluidising gas jets (54, 76) towards an adjacent trench
***characterized in that** the main gas flow direction of the multiple gas outlets forms an angle with the normal of an adjacent trench so as to direct solid material along the trench towards one of the at least one discharge duct.*"

"*11. A method of removing coarse material from a fluidized bed reactor, said method comprising the steps of:*
maintaining a fluidised bed of solid particles in a reaction chamber of the fluidized bed reactor by injecting fluidising gas jets (54, 76) from a windbox in a lower portion of the reactor into the reaction chamber through a grid construction, the grid construction including multiple nozzle lines (48, 82) having continuous structures providing smooth surfaces for distributing fluidizing gas from the windbox into the reaction chamber, for suspending the fluidized bed in the reaction chamber; and
removing coarse material from a bottom of the reaction chamber, said removing step comprising transporting coarse material along multiple trenches (50, 78) arranged in the grid construction between the multiple nozzle lines, by combined gas streams (56) formed from the gas jets."

Claims 2 to 10 and claims 12 to 25 represent particular embodiments of the subject-matter of claims 1 and 11, on which they depend.

II. The following documents filed during the opposition proceedings are relevant for the present decision:

D7: JP 04 335 904 & PAJ abstract
D10: US 4 475 467
D11: FR 2 720 055
D12: GB 2 035 968
D13: JP 09042636 & PAJ abstract
D14: GB 0 119 521

III. In the contested decision, The opposition division decided to disregard documents D11 to D14, because they were late-filed and not more relevant than the documents filed with the notice of opposition.

The opposition division concluded that the subject-matter of independent claims 1 and 11 as granted involved an inventive step starting from document D7 as the closest state of the art. In particular, it held the subject-matter of the claims as granted to be not obvious in the light of a combination of documents D7 and D10.

IV. With its statement of grounds of appeal dated 20 April 2010, the opponent (hereinafter "the appellant") requested that documents D11 to D14 be admitted into the appeal procedure and that the patent be revoked on the grounds that the subject-matter of claims 1 and 11 of the contested patent lacked inventive step over the following combinations of documents: D7 with D10, D10 with D13, D2 with D11, D3 with D11, D13 with D11, or D7 with D11.

The appellant did not request oral proceedings.

V. With a letter dated 24 August 2010, the patent proprietor (hereinafter the "respondent") filed its observations to the grounds of appeal and requested oral proceedings in case the board would not maintain the patent as granted.

VI. From the written submissions, the parties' requests are established as follows:

The appellant requests that the decision under appeal be set aside and that the patent be revoked.

The respondent requests that the appeal be dismissed.

Reasons for the Decision

1. *Admissibility of documents D11 to D14*

1.1 In the first instance proceedings, the opposition division exercised its discretion under Article 114 (2) EPC in deciding to disregard the belated documents D11 to D14.

1.2 According to the case law of the boards of appeal (see e.g. T 1485/08, points 2.2. and 2.3 of the Reasons), when reviewing a discretionary decision of a first instance department, the board should only assess whether the discretion has been exercised according to the wrong principles, or without taking into account the right principles, or in an unreasonable way. Regarding the admission of a document filed belatedly during the opposition proceedings, the crucial criterion is whether the document is *prima facie* relevant.

1.3 In the present case, this criterion was applied by the opposition division for discarding documents D11 to D14, since it explained that these documents were not more relevant than the documents referred to in the notice of opposition.

1.4 In the boards' view, the assessment of the opposition division is not manifestly erroneous either, since documents D11, D12 and D14 concern technical fields which are far away from the technical field of the invention and its specificities (D11 and D12: discharge of silos, D14: filling of cartridge cap shells). The skilled person would thus not prima facie consider the disclosure of such documents as relevant for the technical field at issue, namely fluidised bed reactors. It is true that document D13 relates to the field of concern, but it does not disclose the key feature that the coarse material is transported along a trench or along multiple trenches, thus D13 does not appear to be *prima facie* relevant.

1.5 It follows from the above that the discretionary decision of the opposition division to discard documents D11 to D14 does not result from the use of an erroneous criterion of assessment or from an unreasonable way of exercising its discretionary power. The board therefore has no reason to set aside this conclusion and documents D11 to D14 are in consequence not admitted into the appeal proceedings.

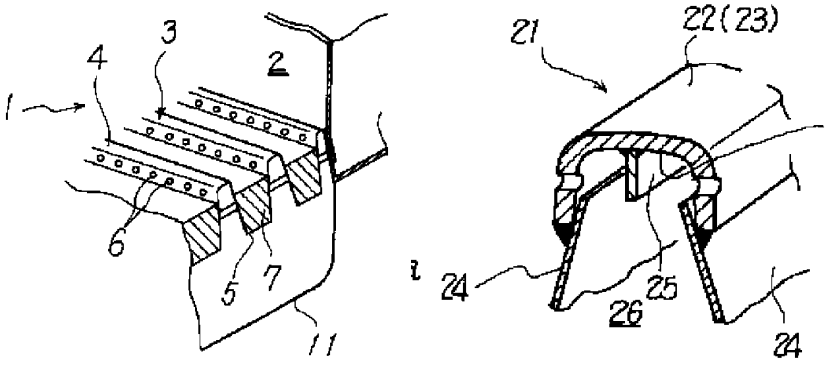
2. *Inventive step of independent claims 1 and 11 as granted.*

By applying the problem-solution approach developed by the boards of appeal, the present board came to the conclusion that, having regard to the state of the art, in particular documents D7 and D10, the subject-matter of independent claims 1 and 11 was not obvious to a person skilled in the art in the following respects.

2.1 The invention concerns **a grid construction** for a fluidised bed reactor optimised for a reliable and efficient removal of coarse material from the reactor and a method of removing coarse material from said fluidised bed reactor (see paragraph [0001] of the contested patent).

2.2 As to the starting point for assessing inventive step, the appellant did not specify whether D7 or D10 represented the closest state of the art. However, owing to the fact that in its grounds of appeal (middle of page 5), the appellant formulated the problem to be solved with respect to D7, the board understands that in its view this document represented the closest state of the art.

2.2.1 D7 (see abstract and Figures 1 and 2 (reproduced hereinafter)) discloses a dispersion plate 1 disposed at a bottom part of a combustion chamber 2 of a fluidised bed type combustion device. The dispersion plate comprises a steel corrugated plate 3 having trapezoidal mountain- and valley shaped parts (4, 5) arranged alternatively, the mountain-shaped parts being



equipped with injection holes 6, and the valley parts 5 being composed of a refractory material 7. According to the abstract, the purpose of this design was "to

prevent a bad influence from being applied to a wall member of a combustion chamber or a refractory material and facilitate a restarting of combustion by a method wherein side surfaces of mountain-shaped part of a corrugated plate are formed with some injection holes for fluidized bed and refractory materials are disposed at valleys communicating with the combustion chamber below the injection holes."

2.2.2 The board notes that there is nothing derivable from D7 which might direct the reader's attention to the removal of coarse particles from the fluidized bed and, accordingly, no discharge duct for such material is disclosed in D7. There is also nothing derivable from D7 which might be read on a directional orientation of the nozzles; they are simply openings on the side walls of the corrugated plate.

In this context, the board has difficulties to acknowledge document D7 as the closest state of the art, because the invention explicitly concerns the removal of coarse material from a fluidised bed reactor, which manifestly is of no concern in D7.

2.2.3 It follows that document D10, which explicitly deals with the removal of uncombusted material during operation of a fluidised bed reactor (see column 1, lines 7 to 12 and 62 to 66), is to be taken as the starting point for assessing the inventive step of the claimed subject-matter.

D10 (claim 1) discloses a grid construction for a fluidised bed reactor comprising a horizontal support surface; centrally disposed conduit means extending

through said horizontal support surface for removing agglomerated material from the reactor; a plurality of fluidising air source means located throughout the area of said horizontal support surface and extending through said horizontal support surface having orifices directed radially inwardly toward said conduit means for directing pressurized air through said orifices into the bed at an acute angle to said horizontal support surface and toward said conduit means for moving said agglomerated material toward said conduit means for removal from the reactor; and peripheral fluidising air source means comprising a plurality of jet nozzles with each jet nozzle containing two orifices, one orifice directing pressurised air substantially vertically into the reactor and the other orifice directing pressurised air into the bed at an angle for moving said tramp material and/or agglomerated material toward said conduit means for removal from the reactor.

2.3 As to the technical problem to be solved according to the contested patent there was a need for an improved grid construction for removing coarse material from the bottom of a fluidised bed reactor, in particular a grid construction in which the sticking of material to the fluidising air nozzles has been minimised (paragraphs [0009] to [0012]).

2.4 As a solution to this problem, the invention proposes the grid construction defined in claim 1 at issue, which is in particular characterised in that it comprises continuous trenches between multiple continuous nozzle lines; and the nozzle lines comprising multiple gas outlets having a main gas flow

direction at side faces of the nozzle lines forming an angle with the normal of an adjacent trench so as to direct solid material along the trench towards the at least one discharge duct.

2.5 As to the question whether the problem as established in the patent in suit has been solved by the solution proposed in claim 1, the board observes that there is no evidence at all for an improvement over the grid construction disclosed in document D10. It follows that the problem underlying the contested patent in the light of this state of the art is to be reformulated in less ambitious terms; in the present case, this means that it boils down to the provision of an alternative grid construction for removing coarse material from the bottom of a fluidised bed.

2.6 The board has no doubt that this reformulated problem is solved.

2.7 On the question whether the solution as proposed in claim 1 at issue was obvious in view of the cited prior art, in particular from the document D7 as suggested by the appellant, the board observes that this document deals with a totally different problem (see points 2.2.1 and 2.2.2 above) and it does not at all tackle the problem underlying the present invention, namely the removal of coarse material from the bottom of a fluidised bed reactor. Document D7 does even not disclose the presence of a discharging duct in the fluidized bed reactor. It follows that the skilled person seeking for an alternative grid construction for removing coarse material from a fluidised bed reactor would not take into consideration the content of

document D7, since it would not find any solution to its problem in this document.

2.8 The remaining documents cited during the opposition proceedings also do not contain any information pointing towards the solution proposed in claim 1 at issue.

2.9 It follows from the above reasoning that, having regard to the state of the art, the subject-matter of claim 1 as granted, and by the same token that of dependent claims 2 to 10 as granted, which includes all the features of claim 1, is not obvious to the skilled person from the cited prior art and thus meets the requirements of Article 56 EPC.

2.10 Regarding now the inventive step of the other independent claim, namely claim 11 as granted, its subject-matter concerns a **method** of removing coarse material from a fluidised bed reactor.

2.11 The reasoning outlined under items 2.2 to 2.8 applies mutatis mutandis to the method of claim 11, which comprises the removal of the coarse material being carried out from the bottom of the reaction chamber and comprising the transport of the material along multiple trenches arranged between the multiple nozzle lines, by combined gas streams formed from the fluidising gas jets.

2.12 It follows that, having regard to the state of the art, the subject-matter of claim 11 as granted, and by the same token that of dependent claims 12 to 25 as granted, which includes all the features of claim 11, is not

obvious to a person skilled in the art and thus meets the requirements of Article 56 EPC.

3. In summary, the appellant's argumentation that the subject-matter of the granted claims lacked inventive step did not convince the board; the patent is therefore maintained in its version as granted.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz G. Raths